This listing of claims will replace all prior versions and listings of claims in this application:

Listing of Claims

1. (Original) A method for optically examining blood vessel walls with a probe through intervening fluid, the method comprising:

    receiving optical signals from the vessel walls through the intervening fluid at the probe;

    analyzing the optical signals to determine whether the probe is close enough to the vessel walls to enable assessment of the vessel walls; and

    using the received optical signals to assess the vessel walls when the probe is determined to be close enough to the vessels walls to enable the assessment of the vessel walls.

2. (Original) A method as claimed in claim 1, further comprising emitting optical illumination from the probe, and the step of receiving the optical signals comprises receiving the optical signals generated by the optical illumination.

3. (Original) A method as claimed in claim 1, wherein the step of analyzing the optical signals comprises determining an amplitude of the optical signals.

4. (Previously presented) A method as claimed in claim 3, wherein the step analyzing the optical signals to determine whether the probe is close to the vessel walls comprises comparing the amplitude of the received optical signals to a threshold and the step of using the received optical signals to assess the vessel walls is performed if the amplitude of the received optical signals is within the requirements of the threshold.

5. (Original) A method as claimed in claim 1, wherein the step of using the received optical signals to assess the vessel walls comprises assessing the vessel walls in response to the spectral response of the vessel walls.

6. (Original) A method as claimed in claim 1, wherein an operator determines whether to use the received optical signals to assess the vessel walls based on a result of the step of analyzing the optical signals.

7. (Original) A method as claimed in claim 1, wherein the step of analyzing the optical signals comprises comparing the optical signals to a spectral response of the intervening fluid and the step of using the received optical signals to assess the vessel walls is performed if the optical signals are sufficiently different from the spectral response of the intervening fluid.

8. (Original) A method as claimed in claim 7, wherein the intervening fluid is blood and the method further comprises acquiring the spectral response of the blood by extracting a sample of the patient blood and measuring the spectral response of the blood.

9. (Original) A method as claimed in claim 1, wherein the step of analyzing the optical signals comprises analyzing a spectral response of the optical signals based on spectral features of the intervening fluid.

10. (Original) A method as claimed in claim 9, wherein the intervening fluid is blood and the method further comprises comparing the spectral response of the optical signals to known spectral features of blood.

11. (Original) A method as claimed in claim 9, wherein the step of analyzing the optical signals comprises performing an algebraic analysis of the spectral response.

12. (Original) A method as claimed in claim 11, wherein the algebraic analysis comprises a ratiometric comparison of the spectral response at multiple wavelengths.

13. (Original) A method as claimed in claim 11, wherein the algebraic analysis comprises analyzing a difference in the spectral response at multiple wavelengths.

14. (Original) A method as claimed in claim 1, wherein the step of analyzing the optical signals comprises comparing the spectrum of the optical signals to the spectral response of the intervening fluid.

15. (Original) A method as claimed in claim 1, wherein the step of analyzing the optical signals to determine whether the probe is close enough to the vessel walls to enable assessment of the vessel walls comprises analyzing the optical signals using a chemometric model.

16. (Original) A method as claimed in claim 15, wherein the chemometric model is built from spectral responses of blood samples.

17. (Original) A method as claimed in claim 15, wherein the chemometric model is built from spectral responses of blood samples from a population of patients.

18. (Original) A method as claimed in claim 15, wherein the chemometric model is built from spectral responses of blood samples from a population of patients and augmented by a current patient blood spectrum or spectra.

19. (Original) A method as claimed in claim 1, wherein the step of receiving the optical signals comprises detecting the optical signals at multiple times during multiple cardiac cycles of the patient.

20. (Original) A method as claimed in claim 1, wherein the step of receiving the optical signals comprises detecting the optical signals at multiple times during a single cardiac cycle of the patient.

21. (Original) A method as claimed in claim 1, wherein the step of using the received optical signals to assess the vessel walls comprises averaging spectral responses from multiple points in time.

22. (Original) A method as claimed in claim 21, wherein the step of using the received optical signals to assess the vessel walls further comprises disregarding spectral responses that resemble a spectral response of the intervening fluid.

23. (Original) A method as claimed in claim 1, wherein the step of using the received optical signals to assess the vessel walls comprises averaging spectral responses from multiple times during a single or multiple cardiac cycles, if the spectral responses were collected when the probe was close enough to the vessel walls to enable assessment of the vessel walls.

24. (Original) A method as claimed in claim 1, wherein the step of using the received optical signals to assess the vessel walls comprises averaging spectral responses from multiple points in time if the spectral responses were collected when the probe was close enough to the vessel walls to enable assessment of the vessel walls.

25. (Original) A method as claimed in claim 1, further comprising inducing movement between the probe and the vessel walls.

26. (Previously presented) A method for controlling diagnostic or therapeutic applications, the method comprising:

receiving optical signals from the vessel walls through intervening fluid at a probe;

analyzing the optical signals to determine whether the optical signals are indicative of the vessel walls and/or the intervening fluid; and

initiating diagnosis or treatment of the vessel walls in response to the step of analyzing the optical signals if the probe is determined to be close enough to the vessels walls to enable the diagnosis or treatment.

27. (Original) A method as claimed in claim 26, wherein in the step of analyzing the optical signals, the determination of whether the optical signals are indicative of the vessel walls and/or the intervening fluid is used to determine a proximity between the probe and the vessel walls.

28. (cancelled)

29. (Original) A method as claimed in claim 26, further comprising emitting the optical illumination from the probe, and the step of receiving the optical signals comprises receiving optical signals generated by the optical illumination.

30. (Original) A method as claimed in claim 26, wherein the step analyzing the optical signals comprises determining an amplitude of the optical signals.

31. (Original) A method as claimed in claim 26, wherein the step analyzing the optical signals comprises measuring an amplitude of the received optical signals and the step of initiating diagnosis or treatment is performed if the amplitude of the received optical signals is within the region designated as tissue signal with respect to a preset amplitude threshold.

32. (Original) A method as claimed in claim 26, wherein the step of initiating diagnosis or treatment comprises assessing the vessel walls in response to the spectral response of the vessel walls.

33. (Original) A method as claimed in claim 26, wherein an operator determines whether to use the received optical signals to assess the vessel walls based on a result of the step of analyzing the optical signals.

34. (Original) A method as claimed in claim 26, wherein the step of analyzing the optical signals comprises comparing the optical signals to a spectral response of the intervening fluid and the step of initiating diagnosis or treatment is performed if the optical signals are sufficiently different from the spectral response of the intervening fluid.

35. (Original) A method as claimed in claim 34, wherein the intervening fluid is blood and the method further comprises acquiring the spectral response of the blood by extracting a sample of the patient blood and measuring the spectral response of the blood.

36. (Previously presented) A method as claimed in claim 34, wherein the intervening fluid is blood and the method further comprises acquiring the spectral response of the blood by placing the catheter or probe within the patient in an area that has a large distance between the probe and the vessel wall.

37. (Original) A method as claimed in claim 26, wherein the step of analyzing the optical signals comprises analyzing a spectral response of the optical signals based on spectral features of the intervening fluid.

38. (Original) A method as claimed in claim 37, wherein the intervening fluid is blood and the method further comprises comparing the spectral response of the optical signals to known spectral features of blood.

39. (Original) A method as claimed in claim 37, wherein the step of analyzing the optical signals comprises performing an algebraic analysis of the spectral response.

40. (Original) A method as claimed in claim 39, wherein the algebraic analysis comprises a ratiometric comparison of the spectral response at multiple wavelengths.

41. (Original) A method as claimed in claim 39, wherein the algebraic analysis comprises analyzing a difference in the spectral response at multiple wavelengths.

42. (Original) A method as claimed in claim 26, wherein the step of analyzing the optical signals comprises comparing the spectrum of the optical signals to the spectral response of the intervening fluid.

43. (Original) A method as claimed in claim 26, wherein the step of analyzing the optical signals comprises analyzing the optical signals using a chemometric model.

44. (Original) A method as claimed in claim 43, wherein the chemometric model is built from spectral responses of blood samples.

45. (Original) A method as claimed in claim 43, wherein the chemometric model is built from spectral responses of blood samples from a population of patients.

46. (Original) A method as claimed in claim 43, wherein the chemometric model is built from spectral responses of blood samples from a population of patients augmented by a current patient blood spectrum or spectra.

47. (Original) A method as claimed in claim 26, wherein the step of receiving the optical signals comprises detecting the optical signals at multiple times during a single cardiac cycle of the patient.

48. (Original) A method as claimed in claim 26, wherein the step of initiating diagnosis or treatment of the vessel walls comprises averaging spectral responses from multiple points in time.

49. (Original) A method as claimed in claim 48, wherein the step of initiating diagnosis or treatment of the vessel walls further comprises disregarding spectral responses that resemble a spectral response of the intervening fluid.

50. (Original) A method as claimed in claim 26, wherein the step of initiating diagnosis or treatment of the vessel walls comprises averaging spectral responses from multiple points in time if the spectral responses were collected when the probe was close enough to the vessel walls to enable assessment of the vessel walls.

51. (Previously presented) A method as claimed in claim 26, wherein the step of initiating diagnosis or treatment of the vessel walls comprises averaging spectral responses from multiple times during a single cardiac cycle or multiple cardiac cycles if the spectral responses were collected when the probe was close enough to the vessel walls to enable assessment of the vessel walls.

52. (Original) A method as claimed in claim 26, further comprising inducing movement between the probe and the vessel walls.

53. (Original) A probe for insertion into blood vessels, the probe comprising a probe head that induces movement relative to walls of the blood vessel.

54. (Original) A probe as claimed in claim 53, wherein the probe head rotates and comprises an eccentric mass that induces the relative movement between the probe head and the walls of the blood vessel from the rotation of the probe head.

55. (Original) A probe as claimed in claim 53, wherein the probe head is shaped to interact with flowing blood to move the probe head into proximity with the walls of the blood vessel.

56. (Original) A probe as claimed in claim 53, wherein the probe head is shaped to interact with flowing blood to move the probe head relative to the walls of the blood vessel.

57. (Original) A probe as claimed in claim 53, wherein the probe head comprises fins.

58. (Original) A probe as claimed in claim 53, further comprising gating acquisition of a signal from the vessels walls with a cardiac cycle.

59. (Previously presented) A method for optically examining blood vessel walls with a probe through intervening fluid, the method comprising:

    receiving optical signals from the vessel walls through the intervening fluid at the probe;

    analyzing the optical signals indicative of a spectral response of the vessel walls to determine proximity information concerning a proximity between the probe and the vessel walls; and

    using the received optical signals to assess the vessel walls when the probe is determined to have a desired proximity to the vessels walls.

60. (Original) A method as claimed in claim 59, wherein the proximity information is determined from a spectrum of the optical signals.

61. (Original) A method for optically examining blood vessel walls with a probe through intervening fluid, the method comprising:

inducing movement between the probe and the vessel walls;

receiving optical signals from the vessel walls with the probe;

determining whether the probe is close enough to the vessel walls to enable assessment of the vessel walls; and

using the received optical signals to assess the vessel walls when the probe is determined to be close enough to the vessels walls.

62. (Original) A method as claimed in claim 61, wherein the step of inducing movement between the probe and the vessels walls comprises configuring to the probe to interact with movement in an intervening fluid between the probe and the vessel walls.

63. (Original) A method as claimed in claim 61, wherein the step of determining whether the probe is close enough to the vessel walls comprises analyzing the optical signals.

64. (Original) A method as claimed in claim 61, wherein the step of analyzing the optical signals comprises spectrally analyzing the optical signals.

65. (New) A system for examining blood vessel walls, the system comprising:

a probe for optically examining blood vessel walls by receiving optical signals from the vessel walls through intervening fluid;

an optical source for generating the optical signals;

a detector system for detecting received optical signals from the vessel walls; and

a controller for controlling the optical source and monitoring the response of the detector system to determine a spectral content of the optical signals from the vessel walls, the controller comparing the spectral content of the optical signals to a spectral response of the intervening fluid to determine whether the probe is close enough to the vessel walls to enable assessment

of the vessel walls, the controller using the received optical signals to assess the vessel walls when the probe is determined to be close enough to the vessels walls to enable the assessment of the vessel walls.

66. (New) A system as claimed in claim 66, wherein the controller uses the received optical signals to assess the vessel walls if the spectral content of the optical signals are sufficiently different from the spectral response of the intervening fluid.

67. (New) A system as claimed in claim 66, wherein the intervening fluid is blood and the controller acquires the spectral response of the blood by measuring the spectral response of the blood.

68. (New) A system as claimed in claim 66, wherein the controller analyzes the optical signals to determine whether the probe is close enough to the vessel walls to enable assessment of the vessel walls using a chemometric model.

69. (New) A system as claimed in claim 68, wherein the chemometric model is built from spectral responses of blood samples.

70. (New) A system as claimed in claim 68, wherein the chemometric model is built from spectral responses of blood samples from a population of patients.

71. (New) A system as claimed in claim 68, wherein the chemometric model is built from spectral responses of blood samples from a population of patients and augmented by a current patient blood spectrum or spectra.

72. (New) A system as claimed in claim 68, wherein the controller averages spectral responses from multiple times during a single or multiple cardiac cycles, if the controller determines that the optical signals were detected when the probe was close enough to the vessel walls to enable assessment of the vessel walls.